

87 00092

✓ 12/3/86

MULTI-FAMILY HOUSING
PARKING DEMAND
SANTA ROSA, CA
AUGUST 1985

INSTITUTE OF GOVERNMENTAL
STUDIES LIBRARY

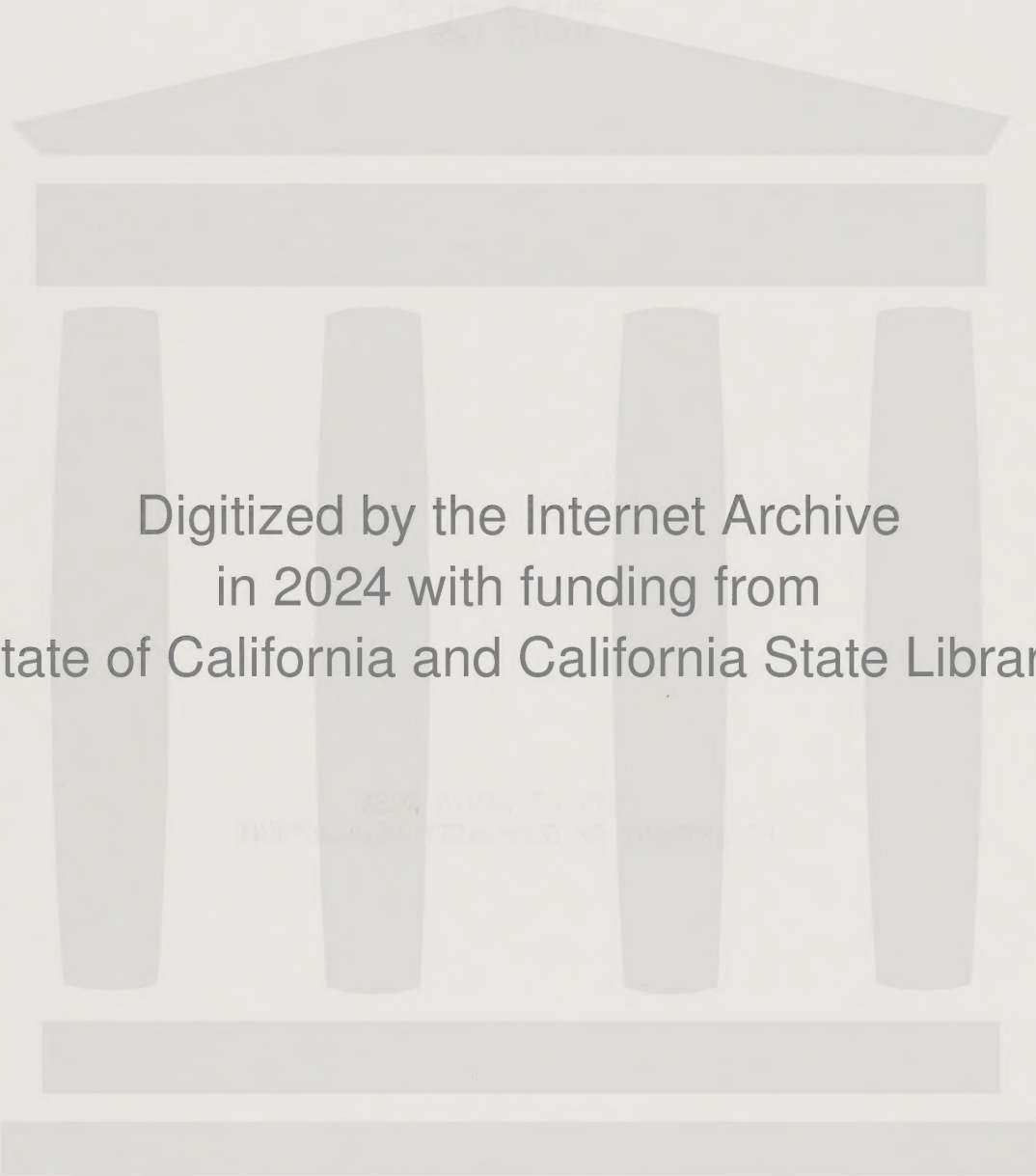
DEC 1 1986

UNIVERSITY OF CALIFORNIA

CITY OF SANTA ROSA
DEPARTMENT OF COMMUNITY DEVELOPMENT

MULTI-FAMILY HOUSING
PARKING DEMAND
SANTA ROSA, CA
AUGUST 1985

CITY OF SANTA ROSA
DEPARTMENT OF COMMUNITY DEVELOPMENT



Digitized by the Internet Archive
in 2024 with funding from
State of California and California State Library

<https://archive.org/details/C124886262>

MULTI-FAMILY HOUSING PARKING DEMAND

- SUMMARY AND CONCLUSIONS
- PURPOSE OF THE STUDY
- SANTA ROSA PARKING REQUIREMENTS
- REVIEW OF LITERATURE
- METHODOLOGY
- PARKING DEMAND
- APPENDICES

LIST OF TABLES AND FIGURES

TABLE 1	Residential Parking Requirements in 115 California Cities	6
2	Residential Vehicle Ownership by Number of Bedrooms (four cities)	8
3	Parking Demand by Project Type (five cities)	10
4	Santa Rosa Apartment Sample - Occupancy and Rent	15
5	Parking Demand Ratios for Residents and Guests of Multi-family Housing	17
6	Condominium Parking Demand	26
7	Adequacy of Parking Requirement Models - Condominiums	27
8	Market Apartment Parking Demand	29
9	Adequacy of Parking Requirements to Models - Market Apartments	30
10	Senior Apartment Parking Demand	32
11	Adequacy of Parking Requirements - Models - Senior Apartments	33
FIGURE 1	Parking Demand Ratios - Condominiums	19
2	Parking Demand Ratios - Market Apartments	21
3	Parking Demand Ratios - Senior Apartments	22

MULTI-FAMILY HOUSING PARKING DEMAND

SUMMARY AND CONCLUSIONS

Parking requirements for multifamily housing in Santa Rosa, as elsewhere, are controversial. The impetus for studying actual parking demand in various types of multifamily housing comes from concerns that current requirements may be more than needed, particularly for condominium projects and for two bedroom apartments. Excess land devoted to parking not only increases the cost of producing housing unnecessarily, but detracts from the overall environment of residential areas. Santa Rosa's requirements for condominiums and for two and three bedroom apartments are on the high end of the range in 115 California cities.

Ten parking demand studies were reviewed and showed a range of demand from 1.03 to 2.08 spaces per unit for apartments; 1.3 to 2.1 for condominium units and .45 to .71 for senior housing projects.

In the Santa Rosa study 12 condominium projects and 20 apartment projects were selected for observation of actual parking demand. Sonoma State University intern, David Goodeson, with the assistance of Jane Christianson, took the lead in interviews with project managers and in making field counts of vehicles at each of the 32 sample projects. Two counts were made for each project to arrive at peak resident and guest parking demand per occupied unit.

Parking demand for condominium projects in this sample ranged from 1.2 to 2.2 spaces per unit for residents and guests. This was, on the average, .35 spaces per unit higher than the demand found in 14 market apartment projects where the range was from .6 to 1.7 with an average demand of 1.35 spaces per unit. The six sample projects with at least 50% occupancy by senior citizens were treated separately. The parking demand range for these six projects was quite broad, however, a significant difference was found between one bedroom projects (.34) and two bedroom projects (.80 spaces per unit).

The mix of units with various numbers of bedrooms also correlated with parking demand in condominium projects. For market apartment projects there was no obvious correlation on this factor. Other factors such as location in proximity to transit and project size showed no correlation. There was some indication

that income levels, as indicated by rent levels and subsidized units, do have a positive correlation with demand. Parking demand was somewhat lower in the three condominium projects with a sizeable number of families with children. This is an indication only and may have been due to other factors. Data in this study is insufficient to make further statements on the subject.

Several requirement models were tested for consistency and accuracy against observed demand in the sample projects. Models with the best fit are those which would produce few or no projects with parking deficiencies and a minimum of excess parking spaces.

For condominiums the best fit is for 1 bedroom units at 1.6 spaces and for 2 and 3 bedroom units at 2.2 spaces per unit. The second best fit would be an overall rate of 2.2 per unit.

The market apartment requirement model with the best fit is a flat rate of 1.8 spaces per unit. The second best fit calls for 1.6 spaces for studio and one bedroom units and 2.0 spaces for two and three bedroom units. For senior housing projects the best fit is with .8 spaces per unit for studios and one bedroom units and 1.2 spaces for two bedroom units.

Where there are reasons to believe that parking demand for a particular project may be lower or higher than basic code requirements - such as in projects designed for families or in luxury apartments or in subsidized housing projects - flexibility could be built into the project in various ways. One, as found in an Orange County study, is to maximize the sharing of parking spaces between residents and guests since peak demand for residents comes at different times of the day and the week from peak visitor demand. Another way would be to provide convenient space that may or may not be needed for parking as a set aside for that eventuality. This could, in the meantime, be set up temporarily for parking overflow but not cast in asphalt. If it turns out after a period of occupancy that the space is not needed for parking, the area could be landscaped and used for other purposes.

In summary, observed parking demand for a sample of Santa Rosa multi-family housing projects indicates that current requirements for condominiums and for two and three bedroom apartments are excessive and that requirements for one bedroom units are a bit too low. Requirements should be changed to reflect actual demand so that there is sufficient but not excess parking provided in the future.

PURPOSE OF THE STUDY

The purpose of this study is twofold - to obtain information on parking demand associated with various types of condominium and apartment projects in Santa Rosa and, two, to use this and related information to examine efficacy of the City's current parking requirements for multifamily housing and to suggest revisions to those requirements as indicated which would better reflect actual demand for parking. In order to balance community planning objectives in regard to parking requirements, the intention is to arrive at standards that reflect average peak demand so that cars don't spill over into adjacent neighborhoods or cause circulation problems on the streets while at the same time avoiding excess land devoted to parking. Sufficient, but not excess is the key.

This survey of local parking demand is important to tailor Santa Rosa requirements to Santa Rosa conditions. Other cities have different demand based on income levels and life style in relationship to use of the automobile.

The impetus for examining multifamily housing parking demand comes from concerns that requirements may be excessive, particularly for condominiums and for two bedroom apartments. This is a possible area to reduce the costs of providing housing, in keeping with the City's policy to encourage well designed, livable, efficient multifamily housing for all economic groups. This policy and these concerns are reflected in the 1984 Housing Element, page 16, where a program action to prepare design guidelines for multifamily housing specifies that such guidelines and requirements should have economic feasibility as one criteria in order to balance needed requirements with containment of production costs.

Over the past two years many multifamily housing projects have been reviewed and approved by the Design Review Board, the Planning Commission and City Council. Many of these have suffered common design problems involving dwelling unit densities, structural bulk and the provision of parking and open space. The pattern of these submissions seems to indicate that in order to provide for current requirements, environmental factors and community preference for two story height limit in most areas, in a reasonably appealing overall site plan - development typically cannot exceed 12 to 15 units per acre for condominium projects and 18 to 20 units per acre for apartment projects.

If the City's policy to expand medium density housing and to encourage some high density housing is to be realized, then unrealistic requirements and constraints

to such development must be removed. Parking requirements are only one area of concern but they affect overall design of housing projects.

By way of illustration, if parking requirements were realistically reduced by .5 spaces per unit, a total of 8,550 square feet less would be required for parking in a 100-unit project. This amounts to one fifth of an acre and would, if not needed for parking, provide space for three or four additional units, for landscaped setbacks, recreation areas, or increased private and common open spaces.

SANTA ROSA PARKING REQUIREMENTS

Residential parking requirements in Santa Rosa differentiate between ownership and rental units. Condominiums, as ownership housing, have the same requirements as single-family subdivisions, which are two spaces per unit - for occupants and 1 per unit for guests. Many other cities consider condominiums as multifamily housing and in some cases require slightly more parking for condominiums than for apartments.

The 3 spaces per unit required for condominiums in Santa Rosa exceeds parking requirements for single-family homes in all but two of 114 other California cities and also exceeds multifamily housing requirements in 105 of these cities (See Table 1).

Apartment parking requirements in Santa Rosa are 1.5 for studios and one bedroom units and 2.5 for two and three bedroom units. As shown in the table, the 1.5 ratio is modal for smaller units in other cities and 2 spaces per unit is modal for larger units. Santa Rosa's requirements for two bedroom apartment units are equalled or exceeded by 16 of 113 other cities in the survey.

Guest parking requirements are specified in 28 of the cities as follows:

.1 - .2/unit	9 cities
.25	8
.33 - .5	9
1 or more	2

The other 87 cities included guest parking with total per unit requirements.

Compared with 114 other California cities, Santa Rosa's requirements for condominium and for two bedroom apartment units are on the high end of the range of requirements.

TABLE 1

RESIDENTIAL PARKING REQUIREMENTS
FOR RESIDENTS AND GUESTS*
(Number of Cities)

Spaces/Unit	1- 1.1	1.25- 1.33	1.43- 1.5	1.67- 1.75	1.85- 2	2.25- 2.33	2.5	2.75 2.8	3	3.5	4	Total
Multifamily - Single Standards	6	2	10		27	3	7		1			56
Per Bdrm. -												57
Studio	11	11	26	3	4		2					
1 Bdrm	3	3	31	6	12							
2 Bdrm	1		6	7	30	5	6	1		1		
3 Bdrm			3	3	22	5	14	4	5		1	
Single Family	10	1	2		98		1				2	114

* "Municipal Parking Standards for 115 Selected California Cities", International Parking Design, Inc. Sherman Oaks, CA - August 1984.

(D1:MFPD-7)

REVIEW OF LITERATURE

Parking requirements for multifamily housing are often controversial. Are there valid distinctions to be made in parking required for luxury versus market rate versus subsidized housing; for housing designed for ambulatory senior citizens versus that for senior citizens requiring special in-house care? Do condominiums require more parking than rental apartments? What are differences in demand between smaller and larger units; for downtown or higher density housing versus projects in outlying areas? Questions also come up about the use of tandem parking for two-car families, the use of street frontages for visitor parking, and whether unassigned, shared parking reduces the overall need for parking spaces in a housing development.

Ten studies of parking demand and car ownership in various types of multifamily housing in U.S. and Canadian cities were reviewed to determine the range of parking demand, relevant factors in this demand, and to design appropriate methodology for the Santa Rosa study.

There were two major approaches used to determine parking demand - resident questionnaires and on-site vehicle counts, coupled with interviews with project managers.

In four studies, questionnaires were sent to residents with questions on unit type and size, car ownership and perceived adequacy of parking. This approach enabled direct correlation of the number of bedrooms in the unit with vehicle ownership.

Findings are shown in Table 2 for Ontario, Canada and for three cities in Southern California.

TABLE 2

MULTIFAMILY HOUSING
RESIDENT VEHICLE OWNERSHIP
BY NUMBER OF BEDROOMS

City, Date No. of Respondents	1 Bdrm.	2. Bdrm.	3 Bdrm.
1. Irvine, CA, 1982			
332 apartment residents -	1.27	1.57	1.65
419 condominium residents	1.43	1.73	1.92
2. Costa Mesa, CA, 1972			
150 apartment residents -	1.37	1.65	-
3. Los Angeles, CA, 1963	1.24	1.46	1.83
4. Ontario, Canada, 1981			
523 apartment & townhouse residents	1.18	1.25	1.46

The demand ratios in Table 2 are for resident parking only. Adding .2 to .25 spaces per unit for guest parking, as is indicated in the literature, the range for each apartment unit size would be:

1.43 to 1.62 for 1 bedroom units

1.50 to 1.90 for 2 bedroom units

1.71 to 2.08 for 3 bedroom units

Residents of condominium units in the Irvine study, demanded somewhat more parking spaces per unit than did those in apartment units. This may be due to larger unit sizes accommodating more drivers and/or to higher income of condominium residents.

The other six studies used the on-site vehicle count approach. Cars were counted at peak times for residents and guests. Results were correlated with various project characteristics such as occupancy by senior citizens, location close to transit or in a high density zone, subsidized housing, and for condominiums versus apartments. The results of five studies are shown in Table 3.

Two cities, Walnut Creek and Lafayette, Indiana arrived at resident parking demand of .45/unit and .71/unit for senior housing projects. Walnut Creek also found a demand of .27 to .30/unit for both residents and employees of senior residential care facilities.

Non-senior subsidized housing projects in Lafayette, Indiana averaged 1.07 resident cars per unit, somewhat lower than the 1.23 found for market rate apartments.

Proximity to transit and location in high density zones was examined in Lafayette, Indiana and in North Vancouver, B.C. In both cases there was less demand for parking in projects close to convenient public transportation.

TABLE 3

MULTIFAMILY HOUSING
PARKING DEMAND
BY PROJECT TYPE
RESIDENTS AND GUESTS

City, Date No. of Units	Condo- miniums	Market Apts.	Senior Citizen Apts.	High Density/ Near Transit	Low Density/ No Transit
1. Oakland, CA 1982	1.3 - 1.4	1.03 - 1.09		25% reduc. within 600' of Bart	
2. Sacramento, CA 1981	1.38 - 1.53	1.25 - 1.39			
3. Walnut Creek, CA 1984 637 market apts. 468 subsidized senior apts.		1.36	.45	1.36	
4. Lafayette, Ind. 1978 4100 apartments (residents only)		1.23	.71	1.23	1.35
5. North Vancouver, B.C. 1978 1863 apartments residents guests				1.38 .15	1.56 .28

In four studies, condominiums were differentiated from rental apartments. In all cases condominium units generated more demand for parking than apartments. Differentials found were .13 in Sacramento; .16 to .27 in Irvine; and .27 to .31 more for condominium units in both the Adams Point area in Oakland, California and in Ontario, Canada. The Ontario study looked at demand associated with both rental and condominium units in townhouses and in apartment projects. Parking demand was practically the same for these two types of housing. However tenure - rental versus condominium ownership - showed a demand differential of .27/unit for apartments and .31/unit for townhouses.

In the final study reviewed, Orange County, 1983, the correlation was made with unit sizes as expressed in square footage. A major conclusion of this study was that each unassigned space is equivalent to 1.17 spaces assigned to a particular unit. The recommended requirements, as a result of the study, are for one assigned space per unit and a range from .17 to 1.50 unassigned spaces for unit sizes ranging from 700 sq. ft. to over 1500 sq. ft. for a total of 1 to 2.5/unit depending on floor area.

Guest parking needs were noted in North Vancouver, B.C. - .15/unit for high density zones and .28/unit for low density zones. In Ontario, Canada, guest parking demand ranged from .24/unit to .53/unit with no significant differences showing between types of housing or tenure. Other places such as Irvine, California, Orange County, and Lafayette, Indiana recommended a guest parking requirement of .2 to .25 spaces per unit.

METHODOLOGY

In the Santa Rosa study, the on-site vehicle count approach was used, primarily because of the cost of carrying out a resident survey. Two samples were selected, one of the condominiums and one of apartments. For each, the selection was based on the need to consider a broad range of project types and to provide a fair representation of Santa Rosa's condominium and apartment development.

An attempt was made to identify and survey all occupied condominium projects with 25 or more units. Information was gathered for twelve condominium projects on unit sizes, rent ranges and occupancy factors, as well as parking demand.

The apartment sample of twenty projects was selected from the City's 1982 Apartment Inventory and from subsequently constructed apartment projects with at

least 25 units. Eight projects have over 100 units and represent half of this size project in the City. Five projects have 50 to 100 units and 7 projects have 25 to 50 units (33% and 25% of the City's inventory of each project size).

For each project in the two samples, preliminary information was collected from project files. Phone interviews with project managers were conducted to obtain information on project occupancy, size and price of units, vacancies, perceived adequacy of available parking, use of garages for storage and estimation of vehicle ownership.

Two field counts were conducted in April 1985 for each project, one prior to 6 a.m. on a weekday for peak resident demand and the second on a weekend evening between 7 p.m. and 9 p.m. to cover peak guest periods. Vehicle counts were recorded by the type of available parking - garages, carports, open, on-street and driveways. (See Appendix for survey forms.)

Resident vehicle counts were related to the number of units to arrive at a resident parking demand ratio on a project-by-project basis. Assumptions on the numbers of cars behind closed garage doors were made in each case based on information obtained from managers. For condominium projects, only four had two car garages and assumptions were made of 1 to 1.7 cars per unit. None of the apartment projects had two car garages, so no reductions were made for non-parking use of garages.

Evening counts reflect a mixture of residents and guests. In some cases, the total number of vehicles in the evening was less than in the morning because there were fewer resident cars on site. In order to arrive at an estimate of the additional guest parking demand, the difference in morning and evening counts of vehicles parked in driveways, in open lots and on the street was noted. Then, for each project, a guest demand ratio was calculated.

Once having arrived at resident and guest parking demand ratios on a project-by-project basis, variables in the projects that could account for differences in demand were examined for possible correlation with demand ratios. Results are discussed later under the heading Parking Demand Ratios.

Finally, various models of per unit parking requirements, both flat rates by housing type and differential rates by numbers of bedrooms, were tested for consistent fit with projects in each sample. Recommendations are made based on the need to provide adequate but not excessive parking.

SAMPLE PROJECT CHARACTERISTICS

The twelve condominium projects contain a total of 813 units. With the exception of Woodlake Condominiums, projects have either all two bedroom units (4 projects) or a mixture of two and three bedroom units (7 projects).

Unit sizes range from 1000 to 1600 square feet in eleven of the twelve projects. Prices for units in the twelve projects range from \$65,000 to \$130,000. Two bedroom units sell for \$65,000 to \$108,000 with a median price of \$75,000. Three bedroom units sell for \$76,000 to \$130,000 with a median sales price of \$110,000.

Of the total 813 units there were 31 vacant at the time of the survey in April 1985. Twenty-three of these vacant units were in two projects. Seven of the projects had no vacancies and the other three projects had a vacancy rate from 2.3% to 3.3%.

Condominium units in the sample are predominately occupied by adults with no children (64%). Approximately 24% of the units have families with children, and the remaining 12% are occupied by senior citizens, according to estimates by project managers. Of the twelve projects, eight have from 70% to 100% adult occupants. Three projects, Brush Creek Villas, Vallejo Villas and the Golden Tee, have an estimated 25% to 50% of the units occupied by families with children, and Vista del Lago #6 has an estimated 33% of their 27 units occupied by senior citizens.

Of the 20 apartment projects in the sample, six were occupied by at least 50% senior citizens. Because it has been established in the literature that car ownership among seniors is generally lower than for younger adults, these six projects were separated from the remaining 14 unspecialized market rental projects for separate analysis of parking demand.

Fourteen of the projects are grouped here as market projects, or unspecialized projects, defined as having at least 50% occupancy by non-senior citizens. Actually, one of these projects, Walnut Grove, is subsidized with Section 8 rent supplements and is primarily occupied by lower income households.

Projects contain either all one bedroom units (4 projects), all two bedroom units (4 projects), or a mixture of unit sizes (6 projects). Of the 1194 units

in this subsample, over half are studios or one bedroom units, 38% have two bedrooms and 7% have three bedrooms. This compares with the larger units found in condominium projects where over 50% have three or more bedrooms and only 5% have one bedroom.

Floor space in apartment units is considerably smaller than in condominium units with the same number of bedrooms. One bedroom apartments range from 480 to 850 square feet with a median of 630 square feet. Two bedroom units go from 600 to 1050 square feet with a median of 950 square feet and three bedroom units cluster around 1,200 square feet. By contrast, three bedroom condominiums in the sample range from 1,200 to 1,650 square feet.

Median rent ranges for market units and for senior citizen units are shown in Table 4. By comparison with median rents found in the City's October 1984 telephone survey, the one and three bedroom unit rents are very close to those found last fall. Two bedroom units in the current study have a median of \$500 to \$510 compared with \$440 median rent in October 1984, and studios in this sample are somewhat lower rent than the previous median of \$400 a month. The difference could be due to small sample size in the case of studio apartments. In the case of two bedroom units, the current study reflects only units in larger projects rather than the total stock in the City. The \$500 a month median probably comes closer to rents of two bedroom units available on the market than did the lower October 1984 figure.

TABLE 4
APARTMENT SAMPLE
OCCUPANCY AND RENT

	Market Projects	Senior Projects	Total
Projects	14	6	20
Units	1194	565	1759
Occupancy			
Adults	868	70	938
Families	206	10	216
Seniors	148	485	633
Studios	38	38	76
Md. Sq. Ft.	450	350	
Md. Rent	\$350- 365	\$220	
1-Bedroom	624	344	968
Md. Sq. Ft.	630	550	
Md. Rent	\$410- 420	\$220- 300	
2-Bedroom	441	176	617
Md. Sq. Ft.	950	700	
Md. Rent	\$500- 510	\$430- 525	
3-Bedroom	98	0	
Md. Sq. Ft.	1200		98
Md. Rent	\$520- 595		

Only ten market units were vacant, a very low .8% vacancy rate. This compares with an estimated 1.2% rental vacancy rate based on the July 1984 Post Office survey in Santa Rosa.

Occupancy - A substantial majority of the 1194 market units are occupied by adults without children (71%). Family units represent 17% and senior citizen units represent 12% of the total in this sample. The proportion of household types here is similar to that found in the condominium sample, with the exception that condominium projects tend to house more families. Eleven of the projects are occupied primarily by adults and three projects have 25% or more family units according to project managers. These are Stacey Manor, Walnut Grove and Bennett Valley Park. It should be emphasized that these proportions are based on estimates of numbers of each type of household living in each project and may not be accurate in some cases.

There were six projects in the sample with at least 50% senior citizens occupancy according to managers. Three of these - Lamplighter, Renee Apartments, and Silvercrest - have a total of 366 studios, and one bedroom units are mostly occupied by senior citizens. Units are small - from 350 to 550 square feet - and rents are mostly subsidized to a low \$220 to \$400 a month. Both rents and unit sizes are consistently and notably lower than for market apartments with one bedroom.

The other three projects - Summerfield Apartments, Oak Apartments and El Prado - have predominately two bedroom units. An estimated 120 of the 195 units are occupied by seniors. The units have from 500 to 880 square feet of floor space, somewhat smaller than two bedroom market units. Rents in two of the projects, at \$400 to \$450 a month, are modest compared with those in market projects. Summerfield, with a 50% senior occupancy, is comparable in rent levels to market projects.

PARKING DEMAND

Parking demand is expressed in ratios of the number of cars recorded, divided by the number of occupied units in each project. Demand ratios were calculated for both residents and guests. Guest parking was counted as the excess number of cars in the evening count over the morning count which were parked in open lots,

in driveways and on streets. Resident and guest ratios were then totaled and compared with various project characteristics to determine what, if any, relationship exists that would be a valid basis for determining parking requirements in various types of multi-family housing.

In the initial comparison of parking demand with project characteristics, it was clear that the demand was consistently higher for condominium projects and consistently lower for apartment projects with a predominance of senior citizens than for market apartments. Survey results are shown in Table 5 for these three types of housing. There were no condominium projects occupied by 50% or more seniors. This factor - the type of housing - turned out to make the most difference in parking demand of any of the factors examined.

TABLE 5
PARKING DEMAND RATIOS
Residents & Guests of
Multifamily Housing

Parking demand	Condominiums	Market Apartments	Senior Apartments
Residents			
Range	1.13 - 2.0	.52 - 1.65	.24 - 1.26
Average	1.61	1.30	.50
Guests			
Range	0 - .44	0 - .25	0 - .06
Average	.10	.04	.03

Occupants of condominiums, as in other studies, demand somewhat more parking than do residents of market apartments. Condominium parking demand in Santa Rosa for both residents and guests - from 1.23 to 2.2 spaces per unit - compares closely with that found in four other cities; Oakland, California; Sacramento, California; Irvine, California; and Ontario, Canada where parking demand ranged from 1.3 in Oakland to a maximum of 2.1 spaces for larger condominium units in both Irvine and in Ontario.

Parking demand for market apartment residents and guests in Santa Rosa - from .56 to 1.7 spaces per unit - shows a wide range that requires further analysis.

Demand in nine other cities went from 1.03 in Oakland, California to 1.85 in Costa Mesa, California (adding .2/unit for guests) .

Senior housing parking demand in Santa Rosa, averaging .5 spaces per unit for residents and guests, was very close to that found in Walnut Creek and somewhat under the demand in Lafayette, Indiana for this type of housing.

Unit sizes, as expressed by the project mix of units with one, two and three bedrooms, were examined for differences in parking demand. Surveys of residents in four other cities showed a definite positive correlation between vehicle ownership and the number of bedrooms in each unit. Santa Rosa, as many other California cities, differentiates between smaller and larger units in parking requirements. Because parking demand was counted for each project as a whole in the Santa Rosa study, it is impossible to get a direct correlation with unit sizes and numbers of bedrooms. The approach used was to classify projects by predominance of one bedroom units, two bedroom units, and mixtures of unit sizes.

For condominium projects, only one - Woodlake - has one bedroom units; four projects have mostly two bedroom units and seven projects have two and three bedroom units. Parking demand ratios for residents and guests of each project type are shown in Figure 1. Numbers refer to condominium projects in the sample. There is a positive correlation between numbers of bedrooms and parking demand in the twelve condominium projects surveyed. A differential of .26 spaces per unit was observed on the average between various categories of unit size and mix. Since all but 56 of the over 800 units in the condominium sample have 2 or 3 bedrooms, a differential between these two unit sizes will be tested for fit in the section on Requirement Models.

FIGURE 1
PARKING DEMAND RATIO
RESIDENTS & GUESTS

Condominiums

Cars/ Occ. Unit	Project Mix		
	1 & 2 Bdrm.	2 Bdrm.	2 & 3 Bdrm
2.2			9
2.1			
2.0		1	18
1.9		2	11, 14
1.8		5	1.84
1.7			19, 10
1.6		1.58	3
1.5			
1.4			
1.3	7 1.31		
1.2		12	
	1 project 104 units	4 projects 205 units	7 projects 504 units

For the fourteen market apartment projects, the mix by the number of bedrooms did not correlate with parking demand (see Figure 2). There is very little difference in demand generated by projects with one bedroom units compared to those with predominately two bedroom units or those with a mixture of unit sizes. In this sample, the striking aspect is the wide range in demand, from .6 to 1.7 spaces per unit. This range might be explained by other factors such as income levels of occupants.

Three projects in the predominately two bedroom category had very low demand levels of .6 to .9 spaces per unit. Two of these, Walnut Grove Apartments and Mendocino Gardens, have below market rents and, presumably, lower income people in residence. In the third, Montevilla, management indicated that 8 or 9 of the 27 units are occupied by senior citizens.

FIGURE 2

PARKING DEMAND RATIOS
RESIDENTS & GUESTS

Market Apartment

Project Mix			
Cars/ Occ. Unit	1 Bdrm.	2 Bdrm.	1 & 2 Bdrm.
1.8			
1.7		S	G
1.6	O	M	
1.5	C		F
1.4			1.37
1.3	1.31	J 1.32	
1.2	V		A
1.1	D		H
1.0			
.9		U, E, R @.6	
	4 projects 437 units	6 projects 453 units	4 projects 299 units

Senior apartment projects show a correlation between demand and the number of bedrooms. Units in the three projects with mostly one bedroom units averaged .34 spaces used per unit, while those in two bedroom projects averaged .80 spaces per unit. This differential might be explained by the fact that one bedroom units are much more likely to be occupied by single elderly women, while two bedroom units are more likely to be occupied by senior couples. There could well be a higher average age, lower incomes, and less mobility among the women than for the couples.

FIGURE 3

PARKING DEMAND RATIO
RESIDENTS & GUESTS

Senior Apartments

Project Mix		
Cars/ Occ. Unit	1 Bdrm.	2 Bdrm
1.3		B
1.2		
1.1		
1.0		K
.9	N	
.8		.80
.7		
.6		
.5		
.4		P
.3	T, L .34	
.2		
	3 projects 370 units	3 projects 195 units

Unit sizes as expressed in square footage of floor space was correlated with parking demand. There is some correlation, particularly for apartment projects where the units under 900 square feet seem to demand noticeably less parking than those with 900 to 1200 square feet. In condominium units the square footage indicator did not correlate with demand. Larger units in the sample actually generated lower demand than did the smaller units. Similarly, both one bedroom and two bedroom senior housing showed no correlation by unit sizes not explained by the number of bedrooms.

Other factors were examined for correlation with parking demand and either no relationship was found or there weren't enough projects in the sample to be able

to generalize the factor as a determinate of parking demand. Each of the three housing types will be discussed separately for the factors which may or may not be correlated with parking demand.

Condominium projects show some correlation with the number of bedrooms and no correlation with square footage. The presence of families with children indicates a somewhat lower parking demand than projects with 70% or more childless adults. There were three projects with at least 30% family occupancy, and in all three cases parking demand was on the low end of the range of projects with the same unit size mix. While three projects are probably not enough to make a generalization, this is an indication that housing designed for families may require less parking than do other projects. Since there are no assurances in a given project that occupancy will continue to be by families, basic parking requirements cannot be based on this factor.

Income levels of condominium occupants, as indicated by selling prices of units, shows no correlation with parking demand. Similarly, the presence of public transportation does not seem to be a factor in this sample. The average parking demand for projects close to transit and those not close to transit was almost identical.

Projects of various sizes show a slight correlation with parking demand being less per unit for projects of over 50 units than for smaller projects. The average difference is less than .15 spaces/unit and does not warrant special consideration in setting overall requirements.

Market apartment projects show no correlation with demand according to the project mix or number of bedrooms. There is a slight positive correlation between demand and floor areas with units under 900 square feet requiring less parking than those between 900 to 1200 square feet.

No other correlations were found in this sample. Too few of the projects were subsidized for low income households, were occupied by families, or were not close to transit to be able to make any statement of differences in parking demand. The size of projects seemed to make no difference in per unit demand for parking.

In senior citizen apartments, likewise, none of the secondary variables affected parking demand. There may be a difference in demand according to the type of senior housing offered such as projects catering with special services to the

older, less mobile population. Low rent projects also could effectively reduce parking demand. In this study there is not enough information to isolate these factors. The main difference in demand seems to be the number of bedrooms that predominate a project. Two bedroom projects occupied predominately by seniors are less different from two bedroom market projects, both in parking demand and in rent levels, than are senior projects with mainly one bedroom units.

Manager interviews turned out to be consistently accurate, compared with field observations, on two counts - the adequacy of parking available and the numbers of one-car and two-car households in the project. In only two or three projects in the total sample, did managers indicate inadequate parking where field counts showed plenty of available parking. Similarly, one condominium project, one market project and two senior projects showed considerably fewer cars than were estimated by managers. Consistency was high enough, however, to make use of manager interviews for ball park estimates of vehicle ownership and parking adequacy in the future.

PARKING REQUIREMENT MODELS

Several models of parking requirements, based on parking demand found in condominiums, market apartment and senior apartments, further differentiated by number of bedrooms per unit, were formulated and tested for accuracy and consistency against actual parking demand data. The models that come the closest to providing adequate but not excessive parking are the basis for recommended changes in the current requirements.

For each model, calculations were made on the percentage difference between the model and the observed parking demand on a project-by-project basis. For example, Model #1 for condominiums would require 2.5 spaces per unit. In all twelve projects in the sample, this requirements would produce more parking spaces than needed. The excess ranges from 14% for Vineyard Meadows to 103% for the Golden Tee project. The percentage differences were calculated in some models for observed peak resident demand plus observed guest demand and, in other models, for observed peak resident demand plus .2 spaces per unit for guest parking. The latter configuration generally adds to the total since guest parking for condominiums averaged .1 spaces per unit and for apartments averaged .04 spaces per unit. Choosing a model that fits the resident demand plus .2 spaces for guests would provide a few extra parking spaces in most projects.

Six models were tested for fit with observed demand in condominium projects.

Table 7 summarizes the results by indicating the number of projects that would have adequate parking (from -1% to +25%); inadequate parking (less than -1%); and excess parking (more than 25% in excess of demand). The number of excess spaces in the latter group is calculated to give an order of magnitude among models.

Assuming it is important to arrive at requirements that would produce no projects or very few projects with inadequate parking, it is recommended that the .2 spaces per unit for guests be used for a bit of leeway. The models using observed guest parking (R & G) are included to show what the actual excesses and deficiencies would have been.

Model No. 1 at 2.5 spaces per unit, as proposed in the recently updated Zoning Ordinance, would have produced an excess of almost 600 parking spaces in nine of these twelve projects, or approximately two and a half acres of land. Model No. 6 seems to have the best fit and is the one recommended for condominium projects in the future. The recommendation of 1.6 spaces for smaller units comes from experience with the apartment sample. Perhaps for condominiums it should be 1.8. The flat rate of 2.2, Model No. 3, also is a close fit and may be advisable because the few one bedroom units in this sample are really not sufficient to set a one bedroom unit demand ratio.

Model No. 5, with a lower rate for two bedroom units, is also a very close fit. The two projects in deficiency here are Cedarwood and Vineyard Meadows, both relatively new projects. Though the actual deficiency is small (-1.5% and -2.2% respectively), this may be too close for comfort in setting code requirements.

TABLE 6

MULTI-FAMILY HOUSING SAMPLE - CONDOMINIUMS
PARKING DEMAND - APRIL, 1985

PROJECT	Units	St. & 1 Bdrm.	2 Bdrm.	3 Bdrm.	% Seniors	% Families	Occ. Units	Res. Ratio (R)	Guest Ratio (G)	Requirement Models % of difference						
										1 @ 2.5 (R+G)	2 @ 2.2 (R+G)	3 @ 2.2 (R+.2)	4 @ 1.6	5 @ 2.0	6 @ 2.2(R+G)	7 @ 1.6
1. Cedarwood	42		42			20%	41	1.93	.10	23	8	3	-1.5	-6	3	
2. Pacific North	38		38		10%		38	1.55	.32	34	18	26	7	14	26	
3. Schoolhouse Creek	37			37			37	1.58	.05	53	36	24	35	24	24	
5. Las Brisas	26		26				16	1.31	.44	43	26	46	14	32	46	
7. Woodlake	104	46	58		20%	10%	91	1.13	.18	91	68	62	39	37	45	
9. Vineyard Meadows	76		18	58	10%	10%	76	2.00	.20	14	0	0	-2.2	-2.2	0	
10. Brush Creek Villas	159		53	106	10%	30%	154	1.64	.01	52	33	20	29	16	20	
11. Old Post Ranch	90		45	45	10%	20%	87	1.69	.22	31	15	16	10	11	16	
12. Golden Tee	99		99		10%	40%	99	1.23		103	79	54	54	40	54	
14. Bennett Valley Knolls	60		20	40	15%	10%	60	1.92		31	15	4	11	0	4	
18. Vista del Lago #6	27		5	22	33%	11%	27	1.85	.19	22	8	7	6	6	7	
19. Vallejo Villa	55		25e	30e	20%	50%	55	1.70		47	29	16	24	11	16	
Totals	813	46	429	338	12%	24%	781	1.61	.10							

(D1:MFPD-21)

TABLE 7

MULTI-FAMILY HOUSING SAMPLE
ADEQUACY OF PARKING REQUIREMENTS

CONDOMINIUMS

Parking Requirement Models:	(Number of Projects)		
	Adequate -1% to +25%	Inadequate (less than -1%)	More than Adequate (26% or more excess) (Excess spaces)
1. 2.5 (R & G)	3	0	9 (595)
2. 2.2 (R & G)	6	0	6 (365)
3. 2.2 (R & .2)	8	0	4 (203)
4. 1 @ 1.6 2 @ 2.0 3 @ 2.2 (R & G)	6	2	4 (227)
5. 1 @ 1.6 2 @ 2.0 3 @ 2.2 (R + .2)	7	2	3 (119)
6. 1 @ 1.6 2 & 3 @ 2.2 (R + .2)	8	0	4 (174)

(D1:MFPD-22)

For market apartment projects, six models were also calculated. Here, there is a wider range of demand. The very low observed demand in several of the projects results in higher numbers of projects which would have excess parking under any model that accounts for projects with higher demand levels. Model No. 1 reflects current parking requirements for apartments. As with condominiums, the amount of excess parking is highest of all models, and yet, there is one project, Hopper Apartments, with a parking deficiency. This is an indication that the 1.5 requirement for one bedroom units may be insufficient. Model No. 3, with a flat rate of 1.8 spaces per unit, is the best fit for apartments and Model No. 6 is a close second. The differentiated rates, calculated in Models 5 & 6 would have produced more excess spaces than would the flat rate for all units. Model No. 4 is further indiction that the 1.5 ratio for smaller units is a bit under demand.

TABLE 8

MULTI-FAMILY HOUSING SAMPLE MARKET APARTMENTS
PARKING DEMAND - APRIL 1985

PROJECT	Units	St. & 1 Bdrm.	2 Bdrm.	3 Bdrm.	% Seniors	% Families	Occ. Units	Res. Ratio (R)	Guest Ratio (G)	Requirement Models % Difference					
										1. St. & 1 @ 1.5 2&3 @ 2.5 (R+G)	2. @ 1.8 (R+G)	3. @ 1.8 (R+.2)	4. St. & 1 @ 1.5 2&3 @ 2.0 (R+G)	5. St. & 1 @ 1.6 2&3 @ 2.0 (R+G)	6. St. & 1 @ 1.6 2&3 @ 2.0 (R+.2)
A. Colonial House	32	20	12		35%		32	1.16		62	55	32	46	51	29
C. Hopper Apartments	120	120			5%		120	1.29	.25	-3	17	21	-3	4	7
D. Mayette-Montgomery	32	32			10%		32	1.06		41	70	43	41	51	27
E. Mendocino Gardens	33		22	11			33	.79	.06	194	112	82	135	135	102
F. Montecito Pines	76	36	40		10%	15%	76	1.47	.03	35	20	8	17	21	8
G. Stacy Manor	82	40	42		10%	30%	81	1.62	.07	19	6	-1	4	6	-1
H. Brookside	114	72	42		10%	20%	110	1.12		67	61	36	50	56	32
J. North Street	31		31		20%		30	1.30		92	38	20	54	54	33
M. Bennett Valley Park	180	24	132	24	15%	25%	179	1.55		53	16	3	25	26	11
O. Stony Brook	55	50	5		10%		55	1.50	.07	1	15	6	-2	4	-3
R. Montevilla	27		27		30%		27	.52	.04	346	221	150	257	257	178
S. Country Club	78	18	36	24	15%	20%	78	1.65		37	9	-3	14	16	3
U. Walnut Grove	104	20	52	32	20%	60%	104	.88		162	125	67	116	118	78
V. Coddington Mall	230	230			10%	5%	230	1.16		29	55	32	29	38	18
TOTALS	1194	662	441	91	12%	17%	1187	1.30	.04						

TABLE 9

MULTI-FAMILY HOUSING SAMPLE
ADEQUACY OF PARKING REQUIREMENTS

Market Apartments

Parking Requirement Models:	(Number of Projects)		
	Adequate (-1% to +25%)	Inadequate (less than -1%)	More than Adequate (26% or more excess) (Excess spaces)
1. St. & 1 @ 1.5 2 & 3 @ 2.5 (R + G)	2	1	11 (684)
2. 1.8 (R + G)	6	0	8 (445)
3. 1.8 (R + .2)	6	1	7 (318)
4. St. & 1 @ 1.5 2 & 3 @ 2.0 (R + G)	4	2	8 (372)
5. St. & 1 @ 1.6 2 & 3 @ 2.0 (R + G)	5	0	9 (595)
6. St. & 1 @ 1.6 2 & 3 @ 2.0 (R + .2)	6	1	7 (425)

(D1:MFPD-25)

The six senior citizen apartments in the sample are so varied that this method of arriving at expected demand has limitations. Here the guest parking addition was set at .1 rather than .2 spaces per unit. Model No. 3 which differentiates between smaller and larger units is recommended as a basic requirement for senior housing projects. These rates are somewhat higher than parking demand for projects specifically designed for seniors in both Walnut Creek (.45) and Lafayette, Indiana (.71) as well as above the average demand found in Santa Rosa of .34 for one bedroom units and .80 for two bedroom units. As discussed previously, parking demand may be more related to the age, income, health and mobility of residents. In projects designed specifically for older people needing more support services, as opposed to market projects which cater to seniors, parking requirements should be considered relative to experience in other like projects. In Santa Rosa, parking reductions were made for at least three projects designed specifically for senior citizens, Vigil Light Apartments, Friends House and Spring Lake Village.

The experience at Vigil Light, with a .8 ratio, is that there are 30 cars for the 48 units and that parking is adequate. At Friends House, the 30 spaces for 50 units is said to be adequate for residents and inadequate for visitors.

TABLE 10
MULTI-FAMILY HOUSING SAMPLE - SENIOR APARTMENTS
PARKING DEMAND, APRIL 1985

PROJECT	Units	St. & 1 Bdrm.	2 Bdrm.	3 Bdrm.	% Seniors	% Families	Occ. Units	Res. Ratio (R)	Guest Ratio (G)	Requirement Models % Difference				
										1. St. & 1 @ .6 2&3 @ 1.0 (R+G)	2. St. & 1 @ .8 2&3 @ 1.2 (R+G)	3. St. & 1 @ .8 2&3 @ 1.2 (R+.1)	4. 1 (R+G)	5. 1 (R + .1)
B. El Prado	31	4	27		80%		31	1.26		-25	-9	-15	-21	-27
K. Oak Apartments	60		60		75%		60	1.0		0	20	9	0	-9
P. Summerfield	104	12	85	7	50%	10	102	.38	.06	117	161	140	127	108
L. Lamplighter	150	150			100%		150	.30		100	167	100	233	150
N. Renee Apartments	33	29	4		85%		33	.82	.03	-24	0	-11	18	9
T. Silver Crest	187	187			100%		187	.24	.04	114	186	135	257	194

(D1:MFPD-27)

TABLE 11

MULTI-FAMILY HOUSING SAMPLE
ADEQUACY OF PARKING REQUIREMENTS

Senior Apartments

Parking Requirement Models:	(Number of Projects)		More Than Adequate (26% or more excess) (excess spaces)
	Adequate (-1% to +25%)	Inadequate (Less Than 1%)	
1. St. & 1 @ .6 2 & 3 @ 1.0 (R + G)	1	2	3 (158)
2. St. & 1 @ .8 2 & 3 @ 1.2 (R + G)	2	1	3 (246)
3. St. & 1 @ .8 2 & 3 @ 1.2 (R + .1)	1	2	3 (216)
4. 1 (R + G)	2	1	3 (298)
5. 1 (R + .1)	1	2	3 (268)

(D1:MFPD-28)

APPENDICES

- ° SAMPLE PROJECT LIST
- ° SURVEY FORMS
- ° REFERENCES

PARKING DEMAND STUDY

Condominium Sample

Map I.D.	Project Name	Location	Units
1	Cedarwood	2101 W. Steele Lane	42
2	Pacific North	Pacific/North St.	38
3	Schoolhouse Creek	Highway 12	37
5	Las Brisas	Highway 12/Jack London	26
7	Woodlake	3200 Yulupa	
9	Vineyard Meadows	Guerneville Road	76
10	Brush Creek Villas	Brush Creek Road	159
11	Old Post Ranch	Post Ranch/Townview	90
12	Golden "T"	3000 Yulupa	99
14	Bennett Valley Knolls (3-B)	Bennett Valley/Tachevah	60
18	Vista del Lago #6	Bennett Valley/Lakeview	27
19	Vallejo Villa	2501 Vallejo	55

(D1:MFPD-30)

PARKING DEMAND STUDY

Apartment Sample

I.D.	Project Name	Location	Units
A	Colonial House	560 Dexter	32
B	El Prado	25 Herbert	31
C	Hopper Apts.	1163 Hopper	120
D	Mayette/Montgomery	3725 Mayette	32
E	Mendocino Gardens	2068 Mendocino	33
F	Montecito Pines	6600 Mendocino	76
G	Stacey Manor	2389 McBride	82
H	Brookside	2601 McBride	114
J	North St.	1570 North St.	31
K	Oak Apts.	1533 Range	60
L	Lamplighter	2055 Range	150
M	Bennett Valley Park	2900 St. Paul	180
N	Renee Apts.	833 Sonoma	33
O	Stony Brook	155 Stony Point	55
P	Summerfield	589 Summerfield	104
R	Montevilla	1600 Yulupa	27
S	Country Club	2807 Yulupa	78
T	Silvercrest	1050 Third St.	187
U	Walnut Grove	W. Third/Stony Point	104
V	Coddington Mall	Range Avenue	230

(D1:MFPD-31)

SANTA ROSA
PARKING DEMAND STUDY
PROJECT INFORMATION -1

NAME: _____ FILE NO.: _____
LOCATION: _____ MAP I.D. NO. _____
CONTACT: _____

	<u>Total No.</u>	<u>Units Vacant</u>	<u>Size Sq. Ftg.</u>	<u>Rent/ Price</u>
<u>Units:</u>				
Studio	_____	_____	_____	_____
1 Bdrm.	_____	_____	_____	_____
2 Bdrm.	_____	_____	_____	_____
3 Bdrm.	_____	_____	_____	_____
Total	_____	_____		

Parking Spaces
Provided

Total No.

Garages _____

Carports _____

Open & Visitor
Parking _____

No. of assigned Units _____

Driveways _____

On-Street _____

Street Width/
Capability _____

PARKING DEMAND STUDY
MANAGER INFORMATION - 2

PROJECT NAME: _____ MANAGER NAME: _____

DATE: _____

Occupancy

Seniors _____

Families _____

(Children under 16 _____

16-21 yrs. _____

Childless adults _____

Parking Adequacy

Adequate

More

Less

Residents _____

Guests _____

Problems & Comments:

Use of Garages Other Than Parking:

Vehicle Ownership: No. of units with cars

1. _____

2. _____

3. _____

PARKING DEMAND STUDY
FIELD INFORMATION - 3

PROJECT NAME: _____

<u>PARKING DEMAND</u>	<u>Residents</u>	<u>Guest and Residents</u>
Date and time of survey	_____	_____
Garages	_____	_____
Carports	_____	_____
Open	_____	_____
Assigned:	_____	_____
Unassigned (or visitor)	_____	_____
Driveways	_____	_____
On-Street	_____	_____
TOTAL	_____	_____
RATIO	_____	_____

COMMENTS

REFERENCES

1. Municipal Parking Standards
for 115 Selected California Cities
International Parking design, Inc.
Sherman Oaks, CA - August 1984
2. Flexible Parking Requirements
Thomas P. Smith
Planning Advisory Service Report #377
American Planning Association - 1984
3. Lafayette, Indiana
Apartment Complex Parking Study
Tippecanoe County Area Plan Commission - June 1978
4. Walnut Creek, California
Creekside Drive Parking Surveys
DKS Associates, Oakland, CA - July 1984
5. Sacramento, California - 1981
Parking Management and Alternative
Transportation Incentive Program
6. Irvine, California
Parking Ordinance Study
Barton-Aschman Associates, Inc. - Oct 1982
7. Costa Mesa, California
Apartment Parking Space Needs Study
Planning Department, Costa Mesa, CA - April 1972
8. Off-Street Parking Study
Planning Department
District of North Vancouver, BC - May 1978
9. Parking Guidelines for Medium Density Housing
Ministry of Municipal Affairs and Housing
Ontario, Canada - July 1981

U.C. BERKELEY LIBRARIES



C124886262

